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Design and Development of a Community Financial Management Application

Nadia Jusmaningsih¹.

¹ Departement of Electronics Engineering, Faculty of Engineering, Universitas Negeri Padang, Padang, Indonesia

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CORRESPONDING AUTHOR

*E-mail: nadajusmaningsih12@gmail.com

ABSTRACT

Efficient and transparent financial management is crucial for community groups such as cooperatives, MSMEs, residential communities, and social gathering groups (*arisan*). However, many communities still rely on manual record-keeping, which is inefficient and prone to errors. This study aims to design and develop a web-based financial management application to automate the bookkeeping and real-time financial reporting process, thereby enhancing accountability and transparency for community members. The system development methodology used is the Waterfall method, which consists of requirements analysis, system design, implementation, testing, and maintenance. This application was developed using the Laravel framework and MySQL database. The main features provided include income and expense recording, automated notifications for dues payments, and easy access to financial reports for community members. The test results show that this application is capable of reducing the risk of recording errors and improving the efficiency of community financial management. With this system, community members can access financial information faster and more transparently, ultimately strengthening trust in managing shared funds.

Contribution to Sustainable Development Goals (SDGs):

SDG 8: Decent Work and Economic Growth

SDG 9: Industry, Innovation, and Infrastructure

SDG 16: Peace, Justice, and Strong Institutions

1. INTRODUCTION

1.1. Research Background

Efficient and transparent financial management is a crucial factor in supporting the sustainability and accountability of organizations and community groups, such as cooperatives, MSMEs, residential neighborhood communities, and rotating savings groups (*arisan*) [1]. However, the majority of communities still rely on conventional or manual recording methods using physical ledger books and basic spreadsheets [1]. According to a survey by the Indonesian Fintech Association (2022), approximately 65% of community groups and MSMEs still depend on manual bookkeeping [2]. These manual methods carry a high risk of human error, are time-consuming, and complicate the process of compiling real-time financial reports [1][2].

Consequently, financial statements are generally presented only at periodic intervals (e.g., every three or six months) [1]. This limited access to information hinders transparency between executive committees and members, potentially leading to mistrust, internal conflicts, and reduced member engagement [1]. Therefore, an innovation in the form of a web-based financial management application is required to automate the recording of income, expenditures, and member dues, thereby enhancing transparency, accountability, and the operational efficiency of community fund management [1].

1.2. Literature Review

Several relevant previous studies serve as the foundation for this system's development:

- a. Designed a responsive web-based information system for managing village fund execution in Kudus Regency to assist village governments in fund management and providing transparent public information [3].



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- b. Emphasized that the effectiveness of financial management heavily depends on understanding procedures and the readiness of administration, reporting, and accountability systems [4].
- c. Built a web-based application for the Teluk Wetan Rattan Craftsmen Community to replace manual bookkeeping and expand the reach of sales information and reporting [5].
- d. Designed a web-based financial management information system for neighborhood associations (RT/RW) using the Unified Approach (UA) methodology to manage dues data and enable residents to access financial reports easily [6].
- e. Developed a web-based cash flow recording application for BUMDesma Anugerah using the Waterfall method, which proved effective in reducing data recapitulation time and minimizing input errors [7].

1.3. Research Objective

This study aims to design and build a web-based financial management application for community groups by applying the Black Box Testing method [1]. The application is expected to assist executive committees in accurately recording transactions and facilitate community members in accessing financial information and reports in a real-time, efficient, and transparent manner [1].

2. MATERIALS AND METHODS

The system development life cycle (SDLC) method utilized in this research is the Waterfall Model [1]. The stages of the Waterfall method include [1]:

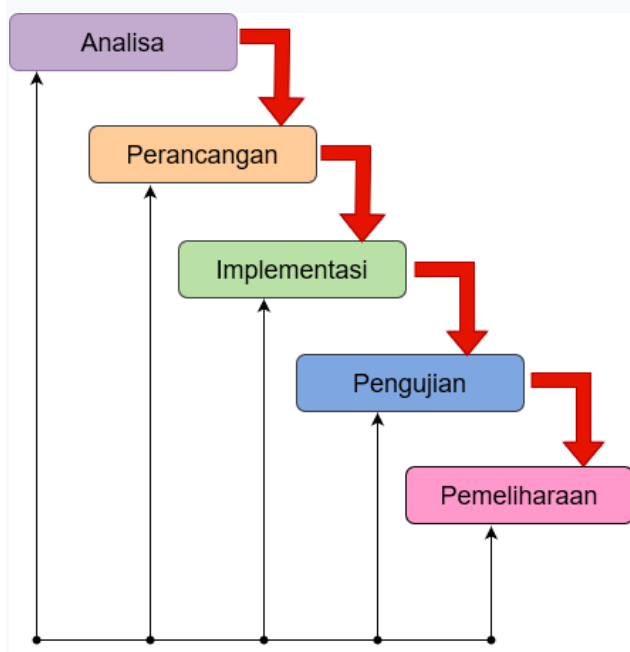


Figure 1. Waterfall SDLC Framework

1. Requirements Analysis: Identifying issues in the existing manual system and gathering functional and non-functional requirements from users (Admin, Treasurer, Residents) through observations and literature review [1].
2. System Design: Modeling the architecture and system workflows using Unified Modeling Language (UML)—including Context Diagram, Use Case Diagram, Activity

Diagram, and Sequence Diagram—along with database design using Entity Relationship Diagrams (ERD) and User Interface (UI) design [1].

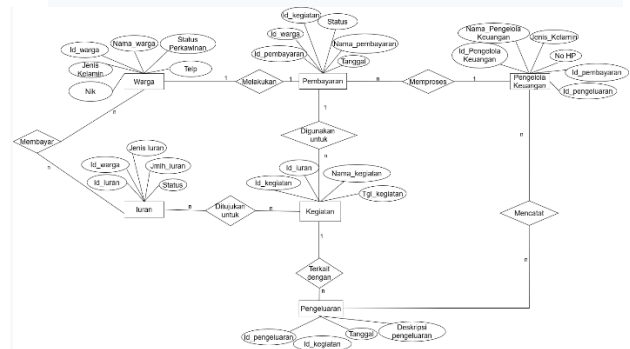


Figure 2. ERD

3. Implementation: Building the web-based application using PHP with the Laravel Framework, HTML, CSS, JavaScript, MySQL database, and Laragon/XAMPP development environments [1].

Table 1. Hardware and Software Specifications

Category	Specification / Tool
Hardware	Processor Intel Core i5 / AMD Ryzen 5, 8GB RAM, SSD 256GB
Operating System	Windows 11 / macOS
Web Server	Apache (via XAMPP / Laragon)
Database Server	MySQL
Programming	PHP (Laravel Framework), HTML5, CSS3, JavaScript Development Tools Visual Studio Code, Web Browser (Google Chrome)

4. Testing: Verifying the system's functional correctness using Black Box Testing and conducting expert validation tests (*expert judgment*) regarding usability, functionality, and visual communication aspects [1].
5. Maintenance: Making adjustments, fixing bugs, and refining features based on feedback gathered during the validation phase [1].

3. RESULT AND DISCUSSION

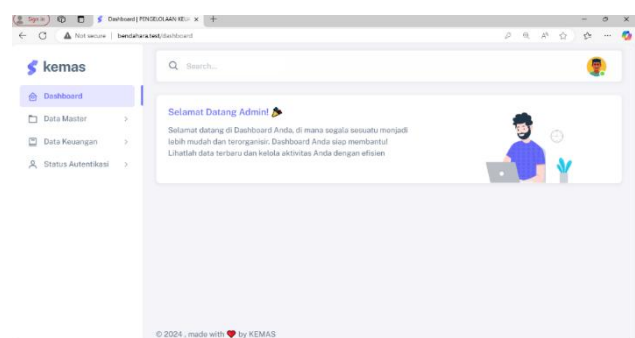


Figure 3. Main Dashboard and Financial Summary Interface

The Community Financial Management Application was successfully developed with multi-user access permissions catering to Admins, Treasurers, and Residents [1]:

- a. Admin/Treasurer Features: Managing resident profiles, community event data, recording income and expenditure transactions, confirming dues payment status, and automatically generating downloadable PDF financial reports [1].
- b. Resident Features: Accessing the information dashboard, viewing community income and expense histories, tracking pending dues/bills, and downloading financial reports [1].

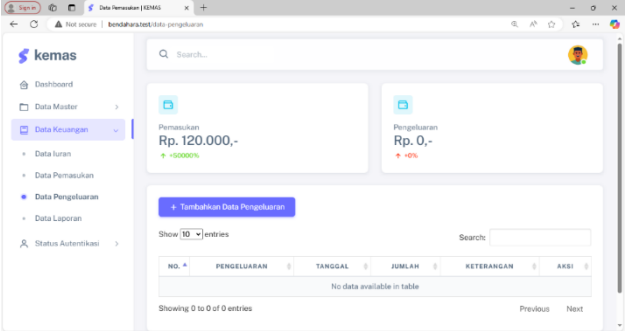


Figure 4. Income and Expenditure Transaction Management Page

System testing was conducted in two primary phases:

- a. Black Box Testing: Functional test results demonstrated that all core features—including login authentication, user registration, transaction management, menu navigation, and report printing—performed seamlessly without encountering operational errors [1].

Table 2. Black Box Testing Results

Test Scenario	Expected Result	Status
User Authentication	System validates credentials & grants access based on role (Admin/Resident)	Pass
Transaction Recording	Income & expense records are saved accurately into the database	Pass
Dues Confirmation	Status updates automatically upon treasurer approval	Pass
Report Generation	PDF financial reports are successfully compiled and downloadable	Pass

- b. Expert Judgment Validation: Validation carried out by two expert evaluators covering usability, functionality, and visual communication yielded an average percentage score of 87.5% [1]. Based on standard evaluation criteria, the application was classified as "Highly Feasible for Implementation" [1].

Table 3. Expert Validation Asesment Results

Assessment Aspect	Score (%)	Category
Usability	88.0%	Highly Feasible
Functionality	87.5%	Highly Feasible
Visual Communication	87.0%	Highly Feasible
Average Score	87.5%	Highly Feasible

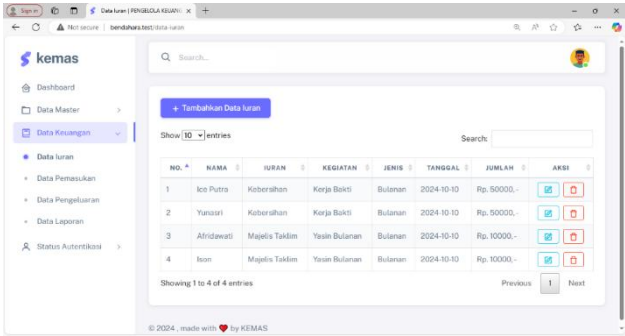


Figure 5. Resident Dues Status and Payment Tracking Page

The practical implications of implementing this system indicate that digitalizing bookkeeping significantly reduces the time required to prepare financial statements, lowers human error rates, and strengthens resident trust in executive officers through transparent financial transaction records [1].

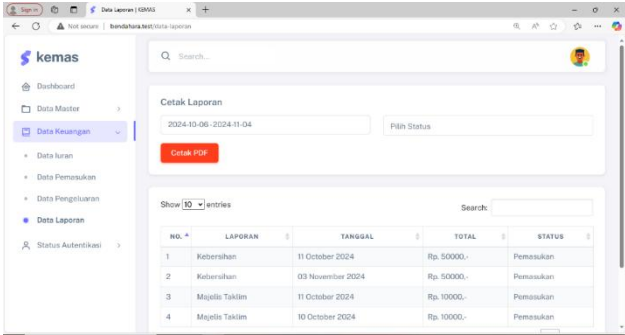


Figure 6. Generate Financial Report Preview (PDF Format)

4. CONCLUSION

A web-based Community Financial Management Application developed using the Laravel Framework and the Waterfall methodology has been successfully designed and implemented [1]. The application proves effective in boosting recording efficiency, accountability, and real-time financial reporting transparency for community members [1]. Based on Black Box Testing results, all features operate with full functionality, and expert validation tests yielded an average feasibility score of 87.5% ("Highly Feasible") [1]. For future work, incorporating digital payment gateway integration and stronger data encryption protocols is recommended to further enhance payment convenience and system security [1].

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